FAA Aviation News

OCTOBER 1996

AVIATION SAFETY FROM COVER TO COVER

Winter's Coming!

U.S. Department
of Transportation

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FEATURES

1 Roll Upset in Severe Icing - Part 1
6 Diamonds Add Sparkle to the Holidays
9 Those Intrepid Souls
10 Safety First - Passengers
10 FAA Asks for Ban of all Oxidizers in Aircraft
11 Did You Pack That Bag Yourself?
13 The Tyranny of Animation
15 Hazardous Materials?
16 Whose Problem Is This Anyway?
18 Airplane Crash Avoided by FAA Tower
19 Look Before You Jump
BACK COVER Passengers' Rights

DEPARTMENTS

21 People In Aviation - Bernard A. Geier
24 FlightFORUM
26 AvNEWS

This issue of *FAA Aviation News* is dedicated to the memory of FAA's Southern Regional Safety Program Manager,
Thomas H. Liederbach,
who died August 5, 1996 in a plane crash near Nome, Alaska while conducting missionary work.
A true gentleman and a gentle man has left us.

"There is no cause half so sacred as the cause of a people. There is no idea so uplifting as the idea of the service of humanity."

President Woodrow Wilson

http://www.faa.gov/avr/news/newshome.htm

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ROLL UPSET IN Severe Icing

Part 1 • by John P. Dow, Sr.

This is intended to provide pilots current information about the background, preventive measures, symptoms, and corrective measures on the hazards of uncommanded and uncontrolled roll excursion—referred to as roll upset—associated with severe in-flight icing. It should be of special interest to pilots flying airplanes certificated for flight in icing conditions since it describes icing conditions outside the airplane certification icing envelope.

Roll upset may be caused by airflow separation (aerodynamic stall) inducing self-deflection of the ailerons, loss or degradation of roll handling characteristics or asymmetrical lift loss. It is a little known and infrequently occurring flight hazard, and it appears to primarily affect planes configured with unpowered ailerons and pneumatic deicing boots; however, further study of all airplane configurations will be conducted.

Roll upset can result from severe icing conditions without the usual symptoms of ice or perceived aerodynamic stall.

The *Aeronautical Information Manual* (AIM) defines severe icing as follows:

> "The rate of accumulation is such that the deicing/anti-icing equipment fails to control the hazard. Immediate flight diversion is necessary."

Severity in the context of the AIM is associated with rapid growth of visible ice shapes most often produced in conditions of high liquid water content and other combinations of environmental and flight conditions. This kind of severe ice is often accompanied by aerodynamic degradation such as high drag, aerodynamic buffet, and stall prior to activation of the stall warning/protection system.

In addition, ice associated with freezing rain or freezing drizzle accreting beyond the limit of the ice protection system should also be described as severe. This kind of ice may not develop shapes as large and may not produce familiar aerodynamic degradation such as high drag but, nonetheless, may be potentially hazardous.

Freezing rain and freezing drizzle contain droplets larger than the certification requirements stipulate, and temperatures near freezing can produce this kind of severe icing.

Background

On October 31, 1994, an Avions de Transport Regionale (ATR) model 72-212 airplane operating as American Eagle flight 4184 suffered a roll upset during descent after holding in what turned out to be severe icing conditions. Full recovery from the upset did not occur, and the airplane crashed, resulting in fatal injuries to all 64 passengers and four crewmembers.

In July 1996, the NTSB announced the probable cause of the accident to be loss of control, attributed to a sudden and unexpected aileron hinge moment reversal that occurred after a ridge of ice accreted beyond the deice boots. A little known form of freezing drizzle aloft, also described as supercooled drizzle drops (SCDD) appears to have been a factor in the roll upset.

While the physics of formation and altitude versus temperature profiles differ between freezing drizzle and SCDD, for the purposes of ice accretion only, freezing drizzle and SCDD may be considered synonymous terms. Droplets of liquid water at temperatures below 0°C (supercooled) having diameters of 40 to 400 microns are found in both.

The accident airplane was operating in a complex icing environment that likely contained supercooled droplets with a liquid water content (LWC) estimated to be as high as 0.7 grams per cubic meter and a temperature near freezing. Estimates of the droplet diameter vary significantly depending on the estimating methodology, but the droplets with the most severe adverse consequences appear to be in the range of approximately 100 to 400 microns or up to 10 times larger than normal certification requirements. No aircraft is certificated for flight in these conditions.

Holding with the flaps extended in the severe icing conditions caused ice to form on and aft of the ATR's deicing boots. The ice aft of the boots could not be shed even though the ice protection system was functioning normally. When the flaps were retracted at a constant airspeed, the airplane suffered a roll upset.

While the crew of the accident airplane may not have been aware that they were holding in severe icing conditions, the cockpit voice recorder indicates they were aware of ice accretion on their aircraft. Additionally, up to the time of the upset, the autopilot was controlling the airplane, so that the pilot was not sensing changes to control forces.

During the investigation surrounding the accident, the FAA uncovered accidents and incidents involving other types of airplanes in freezing rain, freezing drizzle, and SCDD. Collectively these icing conditions are referred to herein as supercooled large droplets (SLD).

The insidious aspect of SLD conditions is that they may challenge contemporary understanding of the hazards of icing and the airplane may not exhibit the usual symptoms or cues associated with severe icing before loss or degradation of performance, stability, or control characteristics.

What is Being Done to Reduce the Hazard?

To minimize the hazard of SLD conditions, the FAA has established a three-phase program:

- *Phase I* - Remedy the accident airplane type. All ATR 42 and 72 aircraft are now equipped with extended deicing boots that approximately double the coverage on the upper surface of the wings. The increased coverage of the ATR boots is intended to minimize the hazard during inadvertent exposure to drizzle size drops while the crew takes steps to exit the icing conditions.

- *Phase II* - Screen other airplane types similar to the ATR for susceptibility to roll upset in severe icing and correct susceptible airplanes. In addition to the screening, in May FAA issued 18 new airworthiness directives (AD) that affect 29 different aircraft models with unpowered controls and pneumatic deicing boots. The AD require aircraft flight manuals for these aircraft to provide pilots with instructions for identifying severe icing conditions that may exceed the icing envelope and to offer instructions on how to exit such conditions safely.

- *Phase III* - Re-examine all aspects of icing certification, including the large droplet environment, weather forecasting, training, and operation. FAA hosted an International Inflight Icing Conference May 6-8 in Springfield, Virginia attended by over 400 icing experts. The recommendations from the five diverse working groups at this conference have been carefully studied to produce a coherent FAA Icing Plan that covers a broad range of initiatives. Some of the recommendations address:

review of the airplane certification icing envelope (14 Code of Federal Regulations part 25, Appendix C) and icing rules, scientific research to measure and characterize the SLD environment, improve forecasting accuracy and timeliness, improve training and dispatch procedures, harmonize terminology in the regulations and advisory material, improve certification tools for icing, and review the best way to address certification of airplanes in an environment containing SLD.

While the challenges of SLD icing appear to be overwhelming, there are procedures to help identify severe icing conditions and to exit potentially hazardous icing conditions.

For the longer term, there are promising technologies nearing maturation in both detection and protection equipment, as well as a commitment to a thorough reexamination of the entire icing certification process.

Some Ice Is Insidious

While ice can accrete on many airplane surfaces, this discussion will focus on wing airfoil icing. There are an infinite variety of shapes, thicknesses, and textures of ice that can accrete at various locations on the airfoil. Each ice shape essentially produces a new airfoil with unique lift, drag, stall angle, and pitching moment characteristics that are different from the host airfoil and from other ice shapes.

There is a range of effects from these shapes. Some effects are relatively benign and are almost indistinguishable from the host airfoil. Others may alter the aerodynamic characteristics so drastically that all or part of the airfoil stalls suddenly and without warning. Sometimes the difference in ice accretion between a benign shape and a more hazardous shape appears relatively insignificant.

Severe icing (referring to its effects) is often exclusively associated with just ice thickness. For example, it is reasonable, in a given set of conditions, to understand that a certain three-inch shape would be more adverse than a similar one and one-half inch shape in the same place. Contrary to that one criterion, however, there is a case where a five-inch ice shape on one specific airfoil is not as adverse as a one-inch ridge located farther aft on the chord. In another example, a layer of ice having substantial chordwise extent is more adverse than a three-inch accretion in the shape of a double horn. In some cases, relatively thin but rough textured ice on the leading edge of the wing has resulted in disproportionately high drag, increase in stall speed, and little or no advance warning of stall onset, often asymmetrically.

"Severe" ice, as used herein, includes ice that forms beyond the limits of ice protection systems. There are means to detect this kind of hazardous ice. Learning what means are available to assist pilots in recognizing severe ice is important. These means can be visual or tactile cues.

Normal Icing Cues

Visual or tactile icing cues signal the potential for ice to form, the presence of ice accretion, or icing severity. Cues may vary somewhat among airplane types but typically include:

- *temperature below freezing combined with visible moisture*
- *ice on the windshield wiper arm or other projections such as engine drain tubes*
- *ice on engine inlet lips or propeller spinners*
- *decreasing airspeed at constant power and altitude*
- *ice detector annunciation*

Tactile cues such as vibration, buffet, or changes in handling characteristics normally trigger a mental warning that ice has already accreted to a perceptible and, perhaps, detrimental level. Typically, as ice increases in thickness, cues become more prominent.

Using meaningful cues, aircraft flight manual (AFM) instructions provide guidance to pilots when to take adequate steps to activate the various elements of the ice protection system and, as necessary, to exit the conditions.

Abnormal Icing Cues

However, there are event reports involving different airplane types that suggest a disturbing pattern associated with some severe icing. Severe icing may be insidious because it may not present the usual cues to the pilot before hazardous and sometimes irreversible degradation or loss of performance, power, control, or handling characteristics occurs.

Abnormal cues of severe icing will be addressed later in this article where we describe some conditions that merit action by the pilot. Before addressing that subject, it may be helpful to understand what icing certification implies, among other information.

Icing Certification

An airplane may be certificated for flight in icing conditions either as part of the original type certification (TC) process or as a supplement to the type certificate (STC). Icing certification is optional for any aircraft. The continuous maximum icing and intermittent maximum icing conditions established as the basis of the approval are defined in Appendix C of FAR Part 25, Airworthiness Standards: Transport Category Airplanes.

Appendix C describes the variables of LWC and mean effective droplet diameter (MED). MED is a measure of droplet size and distribution and is generally assumed to be equivalent to median volumetric diameter (MVD), a more common and convenient measure of the size of the droplets in an icing cloud. Appendix C also defines temperature and horizontal extent of the icing clouds for continuous maximum and intermittent maximum conditions. These conditions are usually associated with stratiform and cumuliform clouds respectively. The

vast majority of aircraft icing encounters are within the icing environment defined by Appendix C.

Icing Envelope

Appendix C is a sound statistical representation of the natural icing environment, but it does not include SLD. Even though the data for the current Appendix C envelope was collected in the mid 1940's, analysis of recent data hasn't invalidated the envelope. Particularly at temperatures near freezing, the MVD and LWC appear to be representative of 99+% of the conditions normally encountered in flight.

Icing Exposure Increases

In the past there have been infrequent event reports of freezing rain or freezing drizzle encounters. These reports appear to have increased in frequency, especially among airplanes used in regional airline operation. One possible reason for this increase is that there has been a dramatic increase in exposure to icing conditions in general.

For example, in 1975 the number of annual departure for all U.S. trunk carriers (major airlines) was 4.74 million. In 1994, almost two decades later, just the regional airline segment alone has grown to 4.60 million annual departures.

Annual regional airline exposure to icing may be double that of jet aircraft which service the longer routes and tend to operate at higher altitudes above most icing conditions for a greater percentage of their flight time.

More departures imply greater exposure to all icing conditions. It follows, then, that there would be a commensurate increase in the number of flights involving SLD. For whatever reasons, exposure to these hazardous conditions appears to be more frequent than previously thought.

Droplet Size Determines Boot Limit

As prescribed by FAA policy, droplet diameter normally used to determine the aft limit of ice protection system coverage is 40 microns (one micron is one millionth of a meter). Drizzle size drops may be 10 times that diameter (400 microns). That means they have 1,000 times the inertia and approximately 100 times more drag than the smaller droplets.

Because of the above factors, drizzle drops not only impinge on the protected area but also may impinge aft of the ice protection system and accumulate as ice where it cannot be shed. Freezing drizzle often, but not always, occurs at temperatures near freezing that are conducive to runback conditions where there may be little ice on the leading edge. The droplets that strike that area do not freeze immediately, but run back and then freeze in a complex thermodynamic process to produce a variety of ice shapes. So observing the leading edge only, may not provide adequate indication of ice beyond it.

Freezing raindrops may be as large as 4,000 microns. Freezing rain, however, tends to form in a layer—sometimes coating the entire airplane.

Ice from droplets in the size range of freezing drizzle tends to form with less extensive coverage than ice from freezing rain but seemingly with more adverse effects. It can form spanwise ridges, ice fingers or feathers perpendicular to the surface of the airfoil considered by some to be extreme aerodynamic roughness. For some airfoils, freezing drizzle appears to be far more adverse to stall angle, maximum lift, and drag than freezing rain. This is not to suggest that freezing rain be considered harmless.

What About Aircraft Certification Regulations?

No aircraft is certificated for flight in SLD! Although there is ongoing atmospheric research, the SLD environment hasn't been extensively measured or statistically characterized. There are no regulatory standards yet for SLD and only limited means to analyze, test, or otherwise confidently assess the effects of portions of the SLD environment.

Ice shape prediction computer codes currently do not reliably predict ice shapes for temperatures near freezing because of daunting thermodynamics.

Near freezing, as it happens, seems to be where SLD conditions are most often—but not exclusively—reported. Further research using instrumented airplanes is necessary to characterize the SLD environment accurately.

In addition to energy balance problems, there are other challenges not yet addressed by computer codes, such as the shape—hence, drag—of large droplets as they are influenced by the local flow field; fragmentation of drops; and the effect of drops splashing as they collide with the airfoil. Ice shedding and residual ice are not currently accounted for, either.

The National Aeronautics and Space Administration (NASA) and others are aggressively working on these challenging computational tasks and simultaneously pursuing validation of icing tunnels to simulate SLD. Those efforts will require comparison against measured natural conditions. Additionally, there is no single universally accepted standard on how to process or accurately characterize data collected in the natural icing environment. Clearly, until these tasks are complete, certification issues cannot be resolved. They are being addressed thoroughly in the FAA's Icing Plan.

For the sake of argument, assuming that a comprehensive natural SLD icing environment data base is developed, the icing envelope amended in some way, and test means modified and validated to evaluate adequately aircraft in all or part of the SLD environment, what then?

State of the Art Ice Protection Technology

Experience suggests that it has been impractical to protect airplanes for prolonged exposure to SLD icing because—at its extreme—it tends to cover large areas of the airplane. A conventional pneumatic ice protection system able to deal with this extensive ice accretion may affect airfoil perfor-

mance as much as the ice. Conventional electro-thermal systems would require extraordinary amounts of power. Two areas of new technology offer promise for SLD detection and protection systems.

Aerodynamic Performance Measurement and Ice Detection

Improvements in detection system designs ability to recognize ice are maturing. Even more sophisticated designs appear able to measure the effect of ice on aerodynamic parameters.

Surface ice detectors sense the presence of contamination of the detector surface. Some distinguish among ice, slush, water, freezing point depressants, and snow. There are now strip and area ice detector advisory systems in the certification process capable of detecting the thickness of ice on a deicing boot, hence may provide advisory information when to operate the boot, when residual ice is present, that is, the boot didn't clear all of it, and when ice is forming aft of the protected area.

A recent design innovation measures the stall angle and other aerodynamic parameters of a contaminated airfoil. This could be a valuable tool to aid pilots because ice thickness is not the only factor in determining effect. Location, roughness, and shape are important, too. For example, on one airfoil a half-inch step on the upper surface of the airfoil at 4% chord reduce maximum lift by over 50%. Yet, the same shape at 50% chord decreases maximum lift by only 15%. On another airfoil, distributed sandpaper-like roughness elements on the leading edge of the wing may decrease lift by 35%. These new aerodynamic performance monitors also claim a somewhat predictive function, not just warning of airflow separation as it occurs, but before it occurs.

For detectors to be a viable means of reducing the hazard of SLD, sufficient detection and warning time for the crew to exit the conditions safely must be shown. The FAA has generally preferred, where possible, that known hazards be minimized by preventing or removing the formation of ice on a critical surface as opposed to advising of its presence.

Ice Protection

There have been recent advancements in ice protection systems. Innovations include a high pressure pulsed pneumatic system with a conformal metallic or composite leading edge that could replace the familiar black rubber boot.

The system uses a 600 psi pulse of air to clear ice in the range of one-fiftieth of an inch thick. Current pneumatic systems generally are operated when ice is allowed to build to one-quarter to one-half inch thick.

Electrothermal systems consisting of metal coated fibers imbedded within the paint are being tested. One device boasts a low power consumption between one-half watt to upwards of six watts per square inch. Hybrid systems that combine conventional pneumatic boots and advanced electrothermal ice protection are also being explored.

Other low-energy innovations are electro impulsive/explusive deicing systems (EIDI/EEDS) which rapidly discharge electrical energy stored in a capacitor through a coil or conductive ribbons. Eddy currents or magnetic repulsion forces, respectively, cause the iced surface to move at extremely high acceleration but over a small distance to shed ice in the one-fiftieth-inch thickness range or larger.

Another proposed feature of emerging systems is a closed-loop mode of operation where a detector signals that ice has accreted and actuates the system—then waits for another build-up. This feature would allow surfaced to be individually operated at optimum ice thickness.

A system which pumps freezing point depressant fluid through small holes in a wing leading edge has also been certificated for flight into known icing conditions.

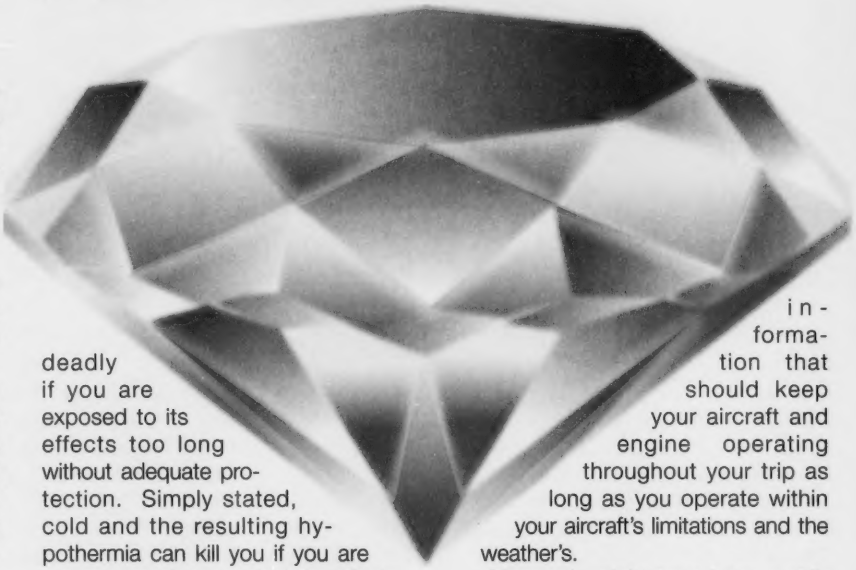
When Will New Systems be Operational?

These systems are in various stages of maturity and test, but as with any system, testing must be successfully completed before there can be assurance that the system will perform its intended function reliably in the entire icing envelope—whatever that may ultimately be.

Part 2 of this article will appear in the November/December 1996 issue of FAA Aviation News *and will contain cues for detecting SLD and preventive and remedial measures for various phases of flight.*

DIAMONDS ADD SPARKLE TO THE HOLIDAYS

by H. Dean Chamberlain



Congress and the media have been debating whether life imitates the movies or movies imitate life. What is there to debate? Both sides are right some of the time. For example, there once was a movie about diamonds being a girl's best friend. At the time of the movie, that might have been true. Now, in 1996, girls are out, women are in, and diamonds are worn by both men and women.

You might think diamonds are everyone's best friend. But I would argue that as winter approaches and the temperatures start dropping and the nights start getting longer, a pilot's best friend is his or her pilot operating handbook (POH) not his or her diamonds. No, we have not been confined in a closed hanger too long with an engine running. If you are wondering what diamonds have to do with flying, let us show you how we can go from diamonds to handbooks in one easy leap of our governmental imagination.

Ice is one of the movies' slang terms for diamonds. Ice, the other kind, is one of the greatest threats to pilots in winter. Both kinds can ground you. Ice, the real cold stuff, can keep your aircraft on the ground. And if you are buying a lot of the other kind of ice, large, clear, cut diamonds for example, you probably can't afford to get off the ground.

If you do get off the ground, ice, the frozen kind, can cause you to fall out of the sky if you are not careful. And if you are not careful, the other kind of ice can also make you spin out of control. Either way, both kinds of ice can get you into trouble.

Hypothermia

As if falling out of the sky is not bad enough, if you survive the resulting crash landing, ice and cold can be deadly if you are exposed to its effects too long without adequate protection. Simply stated, cold and the resulting hypothermia can kill you if you are not prepared to combat its effects. People die each year from exposure because they were not dressed and prepared to survive. The interesting thing about hypothermia is that you don't have to have subzero temperatures for it to hurt you. The right combination of above freezing temperatures, wind, and lack of proper protection can create a potential threat to you. This is why when the wind is blowing, it is important for you to stay dry because when you are wet, the resulting wind chill can quickly cause you to become a hypothermia risk.

The fact is every pilot must be prepared to survive his or her winter flight from takeoff to planned touchdown because statistically a few pilots will not complete every one of their planned flights this winter.

POH's are Worth Their Weight In Diamonds

Although diamonds may have been a girl's best friend in years past, your best friend during winter flying is the knowledge contained in your pilot operating handbook (POH) and a little common sense. Your POH contains information that should keep your aircraft and engine operating throughout your trip as long as you operate within your aircraft's limitations and the weather's.

Diamonds might have been a girl's best friend in the movie, but during the winter of '96, carb heat; the proper multi-weight engine oil; a warm winter coat; your old, warm, sleeping bag; and a pack of matches may be your life saving guardian angels this winter.

Know Your Procedures and Limitations

As we say each year, one of the keys to safe winter flying is knowing the safe winter operating procedures and limitations in your aircraft's operating handbook. For example, if you fly a small, normally-aspirated aircraft in northern Minnesota, you might need to install engine baffles if they are recommended or required by the handbook. Your handbook will also explain proper cold-weather starting and run up procedures for your aircraft. Failure to follow the recommended procedures, including using pre-heat if required, might damage your engine. Your POH might say that you have to wait longer for your oil pressure gauge to register a readout because your engine's cold, congealed oil might take longer to develop a reading.

Icing Conditions

When operating in snow, slush, or rain you need to make sure that your properly deiced aircraft does not re-freeze as you taxi for takeoff or climb after takeoff. Control surfaces have frozen and wheel wells have jammed tires as a result of water and ice picked up during taxi. If you have any doubts about the airworthiness of your aircraft, go back to the hanger or ramp and check it out. If you have a delay, such as waiting for a clearance before taking the active runway, you need to make sure your aircraft is ready for takeoff. There have been several well publicized airline accidents involving aircraft that had been deiced, but, because of delays waiting for takeoff, the aircraft became covered with ice and had an accident on takeoff.

If you are using a deicing fluid to remove ice or frost, follow the directions carefully. Some fluids are designed for use on large, high-speed aircraft and are not suitable for use on small general aviation aircraft with their slower rotation speeds. The problem is some fluids are designed not to blow off an aircraft until a certain speed is reached. This speed may be above the rotation speed of many general aviation aircraft. If you try to takeoff with the fluid still on your wings, it can be as bad as trying to takeoff with frost or any other type of contaminate on your aircraft. You just don't know what is going to happen. You may find yourself becoming a test pilot for your combination of aircraft, deicing fluid, and weather conditions.

No Handpropping

One winter event pilots should avoid, if at all possible, is handpropping their aircraft. The danger of slipping into the propeller, particularly on an ice-covered ramp, is not worth the potential savings. If you have to handprop your aircraft, please make sure the aircraft is securely tied down, and, if someone is manipulating the controls while you handprop, the person knows what he or she is doing. (The FAA recommends that someone qualified be at the controls while you handprop.) The reason is simple. The FAA has a classic old film showing a terrified passenger in a runaway single engine aircraft out of control on a ramp after the pilot handpropped the aircraft and could not get back into the unsecured aircraft.

The Big Guys

Lest we slight those who fly large aircraft—if you fly a business jet or turboprop, do you have any restrictions or requirement to use a fuel additive? Do you know all of your operating limitations for your aircraft? If not, your flight manual has all of the details.

The Importance of Preflight

The importance of a proper preflight during cold weather operations cannot be stressed enough. Frozen control hinges, improperly adjusted control cables, if so equipped, and ice in your fuel system can all spell gloom and doom.

When preflighting your aircraft, know and follow safe deicing procedures for your aircraft if the aircraft is covered with ice or snow. You should pay particular attention to eliminating any frost on your aircraft because frost on the wings can result in a serious lost of lift. A warm hanger is the best way to de-ice an aircraft.

Ice Versus Heat

Two of the most important sections of your POH deal with flight into known icing conditions and cabin heating. Your handbook states if your aircraft is approved for flight into known icing conditions. If you don't have the proper aircraft certification and the required operable onboard deicing and anti-icing equipment, the rule is simple: You can't fly into known icing.

If your aircraft is approved for such conditions, you must know the proper operating procedures and limitations for using your equipment. For example, if your aircraft has rubber deicing wing boots, does your POH recommend letting the ice build up to a certain minimum depth before operating the boots? You should know.

For those of you who haven't read a POH for an aircraft with wing boots, the reason is if you operate the boots too soon, the expanding boots may not be able to break away the thin ice layer over the boots. The boots may only push the ice layer away from the wing and boots without breaking it. The result is more ice can then build up on top of the ice layer and the boots cannot remove any of it.

You also have to know the proper use of anti-icing and deicing equipment. Improper use may make a safety device ineffective or possibly damage your aircraft. For example, some aircraft have operating limitations for their embedded electric wire windshield heaters to avoid damaging the windshield when the aircraft is on the ground and the system is turned on.

It is also important to know the difference between deicing and anti-icing. There *is* a difference. Anti-icing equipment helps prevent the formation of ice buildup, but it may not be able to remove ice after it forms.

Deicing equipment *can* remove ice after it has formed. Your POH will tell you how and when to operate the specific anti-icing and deicing equipment that may be installed onboard your aircraft.

Inadvertent Icing

Another important thing to know is what to do if your aircraft is not approved for flight into known icing conditions but you inadvertently encounter icing conditions en route. Your POH will have recommended operating procedures such as landing with a higher airspeed than normal or not operating your flaps. The idea is to carry enough speed to avoid stalling your aircraft when it is carrying a load of ice as well as avoiding changing the airflow over the wings at the last moment. The key is knowing what your POH recommends because you are becoming a junior test pilot since the aircraft was not tested or certificated for such conditions.

Aircraft Heaters

Equally important is the safe operation of your aircraft's heating system. If your aircraft has a simple heater shroud or muff system like many small aircraft, you need to ensure it is airworthy because a leaking exhaust system could cause deadly exhaust gasses to enter your heater system and cabin. The reason is these systems use a heat shroud around part of your aircraft's hot exhaust pipe to heat ducted, incoming fresh air that is then used to heat your cabin. Deadly carbon monoxide and other noxious gasses can enter your cabin heater system if you have a leaking exhaust pipe inside the shroud.

If you have a fuel operated cabin air heater, do you know the proper operating procedure? Have you thought of what you would do in case of an in-flight heater fire? Do you know if the heater has its own fuel tank or does it burn the aircraft's fuel? If it burns the aircraft's fuel, do you know its effect on your aircraft's total endurance? These are some of the questions that your POH can answer.

Proper Planing and Survival

Finally, although we have been reminding everyone that a safe winter flight starts with a properly maintained aircraft being flown by a current and knowledgeable pilot, no reminder on safe winter flying would be complete without reminding everyone to wear appropriate winter clothing and to carry a survival kit. As stated in past *FAA Aviation News* articles, the state of Alaska and Canada have laws dictating the types of survival equipment that must carried in aircraft. But in the lower 48 states, the pilot in command of non-commercial aircraft must decide what to carry.

A good guide is to dress for the worst conditions predicted for your route of flight and to be able to survive for the time needed to be found by searchers. The more remote the area or the worse the predicted weather, the more complete your survival kit must be. One safety item that every pilot has available every day of the year, is the option to plan his or her flight route to avoid remote areas by flying along more populated and hospitable routes that offer better off airport landing areas or airports along the route. In many cases, the safety factor of a safer, but slightly longer route outweighs any minor savings in flight time of a more direct but riskier route.

Importance of Flight Plans

No matter which route you fly, you should always file and activate a flight plan. Because without a method of notifying would-be rescuers that you have crashed or have made an off-airport precautionary landing, you might be in for a very long, cold, and risky survival situation. One where diamonds don't count.

The Sparkle of Diamonds

To put a sparkle in your winter and the upcoming holidays, do your part, read and follow the instructions in your POH, add a touch of common sense, and you have the recipe for a safe winter of flying. Who knows, if you are lucky, there might even be some of that other kind of ice in your future. The expensive, cut, kind of ice. The kind measured in carats.

Happy holidays.

THOSE INTREPID SOULS

OUR WOULD-BE CO-PILOTS AND FLYING COMPANIONS

by Christine Stulik

Of late there is an old saying being bantered about: On the great road of life there are passengers, and there are drivers. We pilots are the proud drivers of the sky. But dare we ask, is it not our passengers who are really the brave ones? Could it be those stout-hearted, non-pilot, would-be copilot companions in the cockpit are the truly courageous? Our loved ones, significant others, relatives, colleagues, friends, and reluctant friends of friends—the flying companions who look up to us and entrust their very lives to us. And, if it comes down to it, they may be the "pinch hitters" who sometime may have to fly for us.

Very often the privilege of flying and the degree to which we as pilots enjoy it depends greatly on those who would wing their way alongside us. After all, the joys of life are so much sweeter when they are shared, *n'est pas*? On the practical side of things, there is the dilemma of the less than enthusiastic partner in life who would be a compadre in aviating if it weren't for the very common fear of flying factor. A Sunday morning decision to go flying together could mire down to two people saying, "You take the high road and I'll take the low..." Lonely at best. It would make sense then to address this situation.

"Pinch Hitter"® courses are designed for non-pilots to learn the very basics of aerodynamics, the use of radios, basic instrumentation, and simple navigation along with all-important emergency procedures. These courses are invaluable for those sitting in the "right seat." It gives the companion a better understanding of the flying environment, and knowledge to them is the great equalizer in these things, wouldn't you agree?

Another matter in this regard is the very legitimate concern for most non-pilots in the event of pilot incapacitation, rare though it is. However, it is in the back of the mind of many a passenger.

Data from the National Transportation Safety Board show very few cases, indeed. Incapacitation is documented by type, such as, illness, alcohol- or drug-related, etc. The result of the incapacitation, whatever kind it is, is that all on board are affected. Not surprisingly the chances for survival of the occupants in an airplane with an incapacitated pilot are greatly increased by the amount of preparedness and experience of the non-pilot who must take the controls. The importance of instruction given, especially the hands-on flying experience for non-pilots, in "Pinch Hitter"® courses is obvious. Learning to land the airplane can turn a "nervous Nellie" into a competent and valuable partner in the sky!

In 1984 I had attended a "Flying Companion Seminar" given by the Orange County chapter of The 99's, Inc. I had been flying with a Vietnam veteran wheelchair pilot as his companion, and he suggested I go to the seminar to learn more about the airplane and the "mysteries" of the cockpit. The seminar I attended gave me just the encouragement I needed. In fact, I went on to become an instrument rated private pilot and a real flying buddy to the friend I'll always be indebted to for opening the door to a fantastic new world for me.

Try to remember the song that says, "Oz never gave the Tin Man anything he didn't already have." It's like the "Wizard" (or pilot) is behind the curtain with all the bells and whistles (must be why they call the E6B the "Wiz" wheel), creating something most people think is beyond their reach. An informed passenger can do all the reaching needed. Our companions can find a heart, the brains, and that there's no place like home in the sky. They can become confident participants in the beautiful blue sky above along with us, the drivers in the sky. It is such a pleasure to enjoy the breath taking scenery en route and know your passengers are at ease for both their confidence in you and themselves as helpful and reliable cohorts.

Keep your eyes open for "Pinch Hitter"® courses and "Flying Companion Seminars" in your area and sign up soon. Help your right seater help you. After 26 years of marriage and 10 years of my flying, my husband got in the airplane with me for the first time just recently. He thinks he may go again.

There's hope for everybody!

To find out about "Flying Companion Seminars" sponsored by a 99's Chapter, call The 99's, Inc. in Oklahoma City, OK at (405) 685-7969 for chapter information for your area. "Pinch Hitters"® courses are put on by the AOPA Air Safety Foundation. For further information call Don Koranda at 1-800-872-2672.

IN THE HANGAR

SAFETY FIRST - PASSENGERS

by Patricia Mattison

The human body is an enigma. At one moment it can be hard as a rock; the next extremely vulnerable. I'll bet you've watched TV program like Rescue 911 that show a series of accidents. Some accidents show a mangled mass of metal in which it appears that no person could have escaped injury, but you learn the driver and passengers escaped totally unharmed. On the other side of the coin, an apparent fender-bender leads to all the occupants of the vehicle succumbing to their injuries. So you start to think, if it's this bad in a car, how can we help prevent injuries and fatalities if we are involved in an aircraft accident?

Pilots receive instruction from their first flight lesson to prepare themselves for the obvious accident scenarios. For instance, a pilot should constantly be looking for a suitable landing place in case of an engine failure. How often does an engine failure happen? Hardly ever, that's how often. If it ever does quit, I, for one, will certainly be prepared. Passengers should be similarly prepared.

Every flight with passengers should start with a complete passenger briefing. This briefing is not reserved solely for charter or airline flights. It is the responsibility of all pilots to be sure that their passengers have their seat belt properly secured. There are times when a passenger is not able to fit in the seat belt available in the aircraft or to buckle the belt themselves. It is up to the pilot to see to it that the seat belt is properly secured and a seat belt extension provided, if necessary.

Passengers must be briefed on how to exit the aircraft in the event of an accident. It is necessary to explain how the doors open to indicate where the emergency exit is located and how to open it. They should know where you stow the fire extinguisher and how to use it.

Alaska State Law requires that specific emergency equipment be carried on board. Passengers need to know where to locate that equipment. It won't do any good if the pilot is incapacitated and the passenger can't locate the emergency equipment, much less use it. Also, show the passengers where the Emergency Locator Transmitter is located and how to turn it on.

Before making the approach to landing, assure that passenger seatbelts are fastened and advise them that you won't be able to hold a conversation with them while you are on approach and while landing.

Many pilots don't brief passengers because they feel it would distress them or that it accentuates the negative. However, your passengers will appreciate your professional attitude, and the flight will be more comfortable for them if they are briefed as to what to expect before each flight.

The human body is remarkable. It can "take a licking and keep on ticking"—most of the time. It is up to us as pilots to assure that we have done everything we can to ensure the safety of the people that we take in our airplanes.

Whether you are a private pilot or a do it for a living, give your passengers a thorough pre-flight briefing. It may save their lives—or perhaps yours.

✈

Ms Mattison is the Safety Program Manager at the Juneau FSDO.

FAA ASKS FOR BAN OF ALL OXIDIZERS IN AIRCRAFT

On July 15, FAA Administrator David Hinson asked the Research and Special Programs Administration (RSPA)—the DOT agency responsible for federal policy concerning transporting hazardous materials—to ban the transportation of oxidizers and oxidizing materials in cargo compartments of passenger carrying aircraft and certain cargo compartments on cargo only aircraft. Oxidizers are materials which, by some chemical process, produce oxygen which can, in turn, cause or enhance the combustion of other materials. (An example of a typical oxidizer is hydrogen peroxide used in color treatments for hair.) The FAA's request is in addition to the temporary, yearlong ban on the transportation of chemical oxygen generators on aircraft.

Administrator Hinson also announced that the FAA would issue an NPRM in the fall calling for the labeling of Class C and D aircraft cargo compartments so that they can be identified by ground personnel loading cargo. Class C compartments contain smoke and fire detectors that alert flight crews, who then deploy fire suppression agents. Class D compartments are designed to smother fires by a lack of available oxygen.

The temporary ban on oxygen generating canisters, the proposed ban on all oxidizers on passenger carrying aircraft, and the proposed labeling of cargo compartments are FAA safety initiatives in response to preliminary findings from the investigation of the May 11 accident involving ValuJet Flight 592, which crashed into the Florida Everglades, killing 110 passengers and crew. Evidence from the investigation indicates a possibility of fire caused or fed by oxygen generating canisters in the cargo compartment of the DC-9.

If you are the type of person who jumps in a cab at the last possible second to get to the airport or who likes the challenge of boarding your flight just as the flight attendant closes the cabin door, you are going to have to change your habits.

With a focus on international flights, the FAA announced on July 25 increased security screening measures for passengers and baggage on both international and domestic flights. Although the U.S. has been at a heightened state of security at its airports since August 1995, the FAA is taking additional actions to prevent or deter criminal or terrorist acts against aviation.

For nearly a year airlines have been required to inspect a photo ID of all passengers and ask certain questions about the passengers' luggage. The public is now asked more detailed questions about luggage, and no exceptions are made for not having a photo ID. Airlines were accepting verbal vouching from a traveling companion for a person who did not have a photo ID.

Now, passengers will not be allowed to board until they can produce a photo ID. (Just a few days after the FAA announcement, a group of tourists in Baltimore was delayed and had to take a later flight when one traveler left her driver's license at home. The airline

Increased Security Measures at U.S. Airports Will Mean Delays for Airline Passengers

by Phyllis Anne Duncan

required her to go home and get the ID before acknowledging her ticket. She lived two hours from the airport.)

No curbside check-in of baggage for international flights is allowed, nor is any hotel check-in of baggage for an international flight.

Transportation Secretary Federico Peña said in announcing the new screening measures, "There will be more inspections of bags. There will be more interviews of passengers. There will be delays. There will be inconvenience. There will be longer lines, and so we're asking people to come prepared with photo ID's and prepared to have their luggage—particularly when it is checked in—to be inspected." He added, "But we have found that every time we have increased security in our airports and with our airlines that the traveling public has been very supportive and very cooperative."

FAA Administrator David Hinson indicated the average delay a passenger would face could depend on "...the size of the airplane. So a 200-passenger airplane would incur less delay, probably, than a 400-passenger airplane...depending upon the time of day and the day of the week...."

FAA suggests several things you as a passenger can do to ease the inevitable delay:

- First, arrive early. The unofficial rule of thumb has always been one hour before a domestic flight and one and a half to two hours before an international flight. You will want to increase those times perhaps by as much as 50% or more.

- Clearly label your luggage with your name and address and be prepared to answer questions about your bags, perhaps beyond the one or two questions asked now about whether you packed your own bags or if someone you don't know asked you to carry something for them. You might want to invest in a more substantial luggage tag than the little paper ones provided by the airline.

- Be prepared to have carry-on or checked baggage inspected. This could mean leaving checked baggage unlocked to allow it to be hand-inspected. Your carry-on baggage may be hand-checked at the metal detector, so be prepared for that as well. And try to keep an open mind about it. The security officers are only doing what they have been instructed to do; it is not a personal affront to your dignity, although it may seem like it. You may be asked to operate a computer, cassette tape player, CD player, or other electronic "toy." You may be asked to open or operate a camera, so it may be best to carry the film separately and load the camera upon arrival at your destination.

- After checking your bags, proceed directly to your gate so you won't miss your flight. Your checked bags could be considered suspicious if you do not board your flight. They will be removed and handled appropriately.

Gore Commission

On the same day as these increased security measures were announced, President Clinton also announced the formation of the Gore Commission—headed by Vice President Gore—on Aviation Security and Safety. Vice President Gore was tasked with assembling a commission of industry and government officials and to report back to the President within 45 days (mid-September).

When the results of the Gore Commission's review are made public, we will detail them in *FAA Aviation News*.

Secretary Peña announced these two initiatives "in light of the questions being asked" about the crash of TWA Flight 800 on July 17. As of press time, the National Transportation Safety Board (NTSB) and the Federal Bureau of Investigation (FBI) had yet to indicate whether the crash of TWA Flight 800 into the Atlantic Ocean off East Moriches, Long Island was a "criminal act or mechanical failure." Two hundred thirty passengers and crew died when the 747 broke apart and plunged into 120 feet of water, 10 miles off Long Island, NY.

Since the bombing of Pan Am Flight 103 over Lockerbie, Scotland in 1988, the FAA has made many, major improvements in civil aviation security. Among them are:

- The placement of Federal security managers at 19 of the U.S.' largest and busiest airports,

- The placement of 17 security liaison officers overseas,

- Increased security for all cargo and mail,

- New employment and training standards for screeners and other security personnel at U.S. airports,

- Guidelines for airports to build in security considerations in new construction,

- Employment investigations and criminal history record checks of employees,

- Joint FAA/FBI vulnerability assessments at major U.S. airports,

- Improvement of the flow of intelligence information to the FAA and the aviation industry, and

- State-of-the-art explosives detection systems (CTX 5000) in Atlanta and San Francisco for operational testing.

The FAA is also developing a national strategy for deploying these high-tech explosive detection systems nationally.

THE TYRANNY OF AUTOMATION

by John Sheehan

Are cockpits becoming over-automated or overly sophisticated? Are cockpit crews becoming overly enamored with the new bells and whistles appearing in cockpits? Are flight crews drawn to new automation features because of their Nintendo® appeal?

These questions have been and will continue to be hotly debated in flight departments and airlines around the world because of an increasing number of accidents and incidents associated with automation. But, manufacturers continue to automate and refine automated devices within the cockpit. Obviously, the people who build, certify, and buy these devices believe that automated systems are beneficial to the operation of modern aircraft, but is there an answer to this supposed tyranny of automation?

Automation-related incidents are common knowledge because of their increasing frequency of occurrence. They fall into several broad categories, including:

- **Data Entry Errors**—The KAL 007 shoot-down is the most notable of this error that pits the crewmembers' accuracy and spell check skills against a device, usually a Flight Management System (FMS) entry key pad, that is unswervingly faithful to whatever it receives. A more common occurrence is entering the wrong altitude in an altitude alert.

- **Monitoring Failures**—Missing an FMS message, annunciator signal, or FMS page or mode change are common faults under this scenario. Not knowing what to look for or how to find it are the principal causes.

- **System Workarounds**—You can't get the darned thing to do what you want, so you find a clever, albeit dangerous, way to "fool" the machine into getting it to do what you want. For instance, entering the manual Top of Descent locations into the FMS to alter the computed points may yield other, unwanted effects.

- **Mode Misapplication**—Autopilot vertical speed being selected instead of indicated airspeed or Mach number is a common fault. More insidious is working with a very complicated system that yields un- suspected or unanticipated effects such as recent crashes involving engine control and instrument approach effects.

These faults rarely occur in isolation or without contributing factors. Haste, inattention, fatigue, distraction, and other system factors may begin the sequence of events that lead to the incident. As with virtually every type of accident, automated or not, it is a combination of failures that leads to the ultimate result. In the final analysis this means that there are inadequate checks and balances available to the crew to detect and interrupt the fault chain. Awareness, judgement, and good standard operating procedures will most likely serve as chain-breakers.

Some of the situations that may lead to unsafe conditions in advanced technology aircraft (or just about any machine) are:

- **Mode Awareness**—Operating in one mode when you think you are in

another. Heading hold instead of nav track, vertical speed instead of indicated airspeed hold, or fuel computed to an intermediate point instead of destination. Mixing a desired effect with an improper mode (or unknown/unanticipated mode) is the root cause.

- **Situational Awareness**—Where am I? Where am I headed? Where do I want to be? Navigational errors are popular consequences of lack of situational awareness. This may stem from too much attention to an aircraft problem or automation device. More than just a few seconds attention to a non-aircraft attitude or non-navigational problem will rapidly put the crew out of the picture.

- **Systems Awareness**—Electrical, hydraulic, and fuel systems may be complicated, but under normal circumstances, the automated systems manage them quite well. However, poor monitoring or knowledge of systems and their automated masters may lead the unwary crew astray. Failure of electrical or hydraulic systems or fuel exhaustion are common consequences.

- **Increased Heads Down Time**—Automation may demand so much care and feeding that both crewmembers spend uncommon amounts of time ministering to the devices that are supposed to relieve them of routine chores. Result? No one is minding the store. Aviation, navigating, and communicating are sacrificed to undivided attention to the little black boxes. And, nobody is looking outside the cockpit for other traffic.

- **Over-Dependence on Automation**—No system is infallible, even those that are designed to detect failures in other systems. Certain subtle or insidious failure modes may allow unexpected events to occur. Fuel balancing computers are examples of automated systems that can lead us astray when they malfunction.

- **Interrupted Crew Coordination**—When an automated system requires or captures the full attention of both pilots, the stage is set for disaster. The object of crew coordination and crew resource management is a system of checks and balances designed to help the crew to complement each other. When this link is compromised, the team is dissolved and the two crewmembers become a single entity; it's as if one crewmember leaves the cockpit.

The antidotes to these faults all address human frailties and shortcomings in much the same manner as aviation safety practices have evolved over the past 92 years. Perhaps they have a new spin to them because of the automation devices involved, but they still address awareness, training, standard procedures, and crew coordination.

- **Awareness**—Sure, we all know of the hazards associated with automated cockpits, but how often are we lulled into a false sense of security by these marvelous and clever devices? Although the analogy may overstate the case, it's almost like humanity's relationship to a domesticated animal: They are usually friendly but have the capacity to bite when least expected.

- **Training**—Do all crewmembers receive initial and recurrent training in all installed automated systems? And are all modes' operation and potential pitfalls practiced and explored? If the training is received on part-task or computer-assisted training devices, do these devices adequately duplicate the system's interface modes and faults as they do in the real aircraft?

- **Standard Operating Procedures**—Good SOP can solve many automation problems if devised (and revised) to reflect actual operating conditions and if practiced by all crewmembers. Typically there will be one or two crewmembers who are more "creative" than others and devise their own SOP. The result may not be chaos, but the lack of predictability for the remaining crewmember greatly diminishes the effect of the checks and balances afforded by having another set of eyes (and another brain) to monitor the principal's actions. Instituting good SOP and ensuring their use is one of the principal challenges of modern flight department managers.

- **Crew Coordination**—When an aircraft is certificated by the FAA, considerable time is spent in determining whether a second crewmember is required based on anticipated cockpit workload. If it's too much for one, the mandatory minimum is raised because the aircraft's systems are so complex and the dynamics so rapid that one person can't handle it all. The introduction of increased amounts of automation has done little to change the certifying authority's opinion about the necessity for a second crewmember on modern turbojet aircraft. The second person is there not only to divide up a large number of tasks; that person is there to serve as a backup to the pilot, share the tasks, and serve as a safety and systems monitor. If there is a second person present, ensure that he or she is being used for the intended purpose.

The concept of pilot as monitor has been popularized in the joke stating that aircraft will eventually be crewed by a pilot and a dog: The pilot will monitor the automated systems, and the dog will bite the pilot if he or she touches anything.

The second pilot doesn't have to bite; a word will do.

Mr. Sheehan is a Washington-based aviation consultant for Professional Aviation, Inc. (PROAV). *This article originally appeared in the December 1995 issue of* Professional Aviation Briefing. *For additional information, call (301) 695-4555.*

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HAZARDOUS MATERIALS?

Tips for Airline Passengers

Some materials can be very dangerous if carried on an aircraft.

Hazardous materials include many common items from the home, workshop, or garage which, because of their physical or chemical properties, can pose a danger when transported. The following is a partial list of common items that are hazardous materials forbidden in carry-on and checked luggage:

Mace, tear gas, and other irritants
Aerosols containing flammable material
Gunpowder
Gasoline and other flammables
Wet-type batteries; e.g., as used in cars
SCUBA tanks, if pressurized
Safety or "strike-anywhere" matches
Corrosive material
Infectious substances
Loaded firearms
Loose ammunition
Propane, butane cylinders or refills, lighter refills
Any equipment containing fuel
Fireworks, flares
Flammable paint and paint-related material
Poisonous material
Radioactive material

Airlines themselves may prohibit many other materials. When in doubt, check with your airline.

Violators of Federal hazardous materials regulations may be subject to a civil penalty of up to $25,000 for each violation and, in appropriate cases, a criminal penalty.

There are certain exceptions for personal care, medical needs, sporting equipment, and items to support physically challenged travelers. For example:

• Toiletry and medicinal articles containing hazardous material (e.g., flammable perfume) totaling no more than 75 ounces may be carried on board. Contents of each container may not exceed 16 fluid ounces or one pound.

• Matches and lighters may only be carried on your person. However, lighters with flammable liquid reservoirs and lighter fluid are prohibited. Of course, smoking is prohibited on scheduled air carrier flights of six hours or less within the 48 contiguous states and between certain other locations.

• Carbon dioxide gas cylinders worn by passengers to operate mechanical limbs and spare cylinders of a similar size for the same purpose are permitted in both carry-on and checked baggage.

• Carrying firearms on board aircraft is forbidden. Unloaded firearms can be transported in checked luggage if declared to the agent at check in and packed in a suitable container. Handguns must be in a locked container. Check with your airline representative for other restrictions concerning firearms.

• Ammunition may not be carried on board an aircraft. However, small arms ammunition may be transported in checked luggage but must be securely packaged in material designed for that purpose. Amounts may vary depending on the airline. Check with the airline.

• Dry ice for packing perishables in quantities not to exceed four pounds may be carried on board an aircraft provided the package permits the release of carbon dioxide. Further restrictions apply to dry ice in checked luggage. Check with the airline

• Electric wheelchairs may only be transported as checked luggage. The airline may determine that the battery must be dismounted and packed in accordance with airline requirements. Check with the airline.

Some items may be shipped as air cargo. Contact your airline for detailed instructions regarding the shipment of hazardous material.

WHOSE PROBLEM

This letter was forwarded to us by the Safety Program Manager from a southern FSDO. The letter makes some very salient points about pilot and corporate responsibilities; however, we thought it best that it be completely de-identified to protect the innocent—and the not so.—Editor

Operations Manager
Local FBO
Somewhere in the South

Dear Sir:

I flew my Cessna 182 into the FBO on Wednesday night in fairly nasty weather, rented a car, and asked for a topoff and tiedown for several days.

I returned on Sunday to fly back to my home base. As part of my preflight, I always climb onto a small step ladder and physically check my fuel caps. I have done this since one was misaligned in 1980 causing an emergency landing in the woods of Nova Scotia. To my horror this time I found that the left tank cap had simply been laid onto the hole but not twisted on, and the right fuel cap was lying on top of the wing at the end of its safety chain a good nine inches away from the open fuel filler hole.

I had landed in rain on Wednesday, and it rained all day Thursday and Friday, and there was a light drizzle at the time I discovered the caps off. I had to assume it had rained into my fuel tanks for 2 1/2 full days. This has never happened before, and I had no idea what the proper procedure should be. I informed the line crew I had a problem, and I was put in touch with the mechanic on call. I was told to use my plastic fuel sump checker and empty fuel until I saw no water and that there wasn't much else to do.

I did this—and found no water in the plastic holder. I finally got the line crew to come help me hold the tail down and rock the wing up and down, and then I got lots of water. We did this for some time until I was unable to find any more water. I took off.

One and a half hours later I made a precautionary landing when the motor sputtered badly for about 10 minutes off and on. I then recovered several more ounces of water in the right fuel sump. No one was around to help me rock the wings (Sunday is a terrible time to have a problem!), and I again took off after finding no more water. I made sure, however, that I turned to right wing fuel feed off before landing at home.

Other than experiencing the most hellish 3 1/2 hours of my flying life, the rest of the journey was uneventful. But I did find another inch of water in the right sump upon landing—after a left base to final that I'm sure is much more effective at moving water inboard to the sump than I can possibly do on the ground alone.

The reason for this letter is:

a) to make sure this matter is brought to your attention, and

b) to complain about what I feel was a pretty lame attitude toward a most serious life and death situation.

High wing Cessna gas caps are hard to check, and I know a lot of people don't really do it. I never did until that one experience 15 years ago. In this recent case, a visual check from the back of the plane from the ground would not have warned me that the left cap was in fact simply laying on the hole, not screwed in. It would have been just as dangerous as if it were laying on the wing like the other one was. I am positive I would have been landing on the interstate highway within 15 minutes after takeoff had I not checked. Fuel would have been sucked out pretty fast with both tanks open. And what is more frightening is the fact that until we rocked the wing, I found no water. I'm pretty sure I would have gotten off the ground with no warnings. Had I gotten as far as destination I have no doubt I would have lost the engine on left base/final when all that water rolled inboard from wherever it seems to hide out.

Had I not checked, I am convinced I would now be dead.

And yet the attitude all around the FBO was one of sustained, "Well, gee, whose problem is this? I'm not sure it's mine."

To be perfectly fair with the men working the line, I'm not sure one should expect more. Just what are their job responsibilities? I did get a little of the sense that to help some pain-in-the-a** pilot was just maybe beyond the call of duty—especially physically demanding help like rocking the wings. And yet, they did help, and I don't really think they could have done more. Maybe I'm just confusing a "he-probably-did-it-to-himself" attitude with that Southern, laid-back, "don't-get-all-excited-now" attitude.

However, I did expect more from

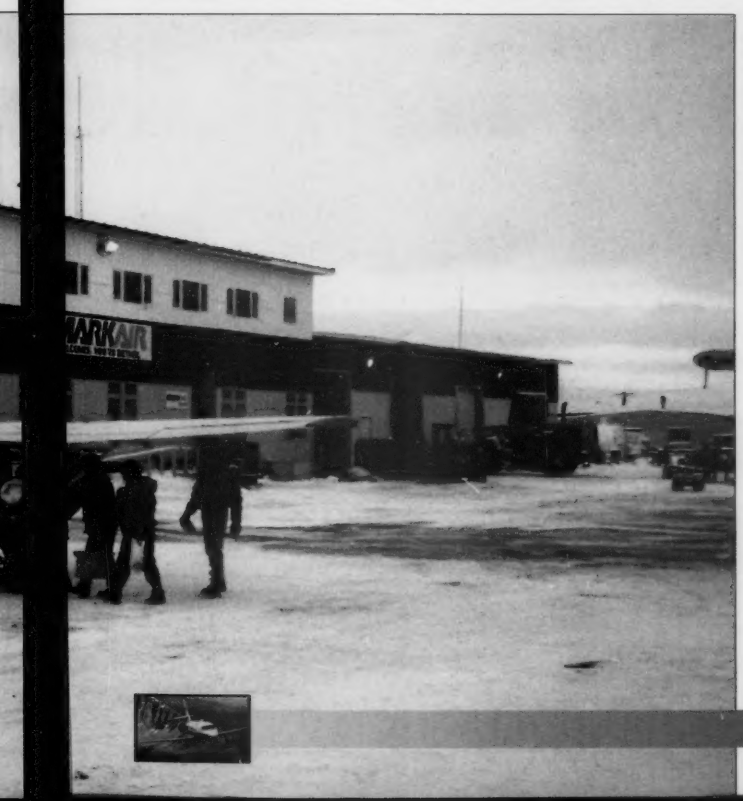
IS THIS ANYWAY?

the mechanic on call—even if it was bad time on my part to interrupt Sunday School preparations. Yes, he did tell me what to do—sort of. Yes, that is probably all he would have done himself, and, yes, I was probably plenty competent to do it. And I am the pilot-in-command, after all.

But surely some bells go off somewhere when something this serious happens. Surely the mechanic knows that had I crashed, your company as well as the avgas manufacturer would have faced tremendous law suits. (In fact I consider myself still at risk since I'm convinced there is still water lurking about in that right tank.) Whether he could do more or not, surely the guy who that day finds himself sitting in the place were the buck stops has to consider that some questions may arise about his attitude toward what he did or did not do when he is made aware of a problem that could lead to a disaster.

I'm not sure what I expected or what he could have done differently from what I did do. I guess I expected to see a few red lights go off and some active "Let's get this taken care of" instead of what I certainly experienced as very passive advice on how to solve the problem on my own. In fact, I almost felt like people there at the FBO didn't really believe me. And what upset me most was the mechanic's assurances that "based on what I was saying, and if it was true" I wouldn't be charged for any gas I had to drain or even for his time if I insisted he come out. Frankly, it never entered my mind whether I would be charged or not, nor was I asking for anything for free then or now. He simply never understood that expense was not my concern. My life was my concern. All I wanted to know was what to do to fly home safely. What could he do as the man in charge to make sure that the company's mistake was corrected properly—no matter who corrected it—me, him, or a lineman?

And it is that attitude that bothers me, that sense that no one is responsible. Such an attitude probably comes from the top in some way. (You?) And maybe something trickles down there that allowed some poor kid to leave the caps off in the first place. That's why I felt compelled to write. This sort of thing is bound to happen, and it happened to me.



Hey, I don't expect anyone to have perfect days and never make mistakes, and I do feel it is my responsibility alone to make sure my plane is safe for flight—and I did that. But I was still not a happy camper, mainly because I got the distinct feeling that the FBO as a company somehow really didn't give a damn all that much. I was reminded of the tee shirt kids wear these day, "S—t Happens." This is not a good attitude for a company to have. Especially one that holds our lives in its hands.

Sincerely,
A concerned pilot

The "concerned pilot" indicated in a conversation that he received a "form letter" from the FBO, regretting that he had had a problem and offering a free overnight for his aircraft the next time he was in town. "Big deal," said the pilot, "if you buy gas there, they give you the tie down free anyway." One would hope that the FBO checked the records to see what lineperson fueled that particular Cessna 182 so that they could give him or her a little remedial fuel cap training. The pilot's letter was written one day after his return to home base, so the level of his anger and concern is evident. And he's right: He may never be able to purge all the water from his fuel system unless he opts for an expensive maintenance procedure. This incident underscores a great deal about pilot-in-command responsibilities. Nowhere in the FAR does it say that the owner of a high-wing aircraft has to climb up on the wing to check the fuel caps, but we can see from this that it's probably a good idea. Of course, the FBO could respond by saying, "Why didn't Mr. PIC stay with the aircraft while it was being fueled and oversee the lineperson's work? That would have solved all his problems." That's true, too, of course, and overseeing fueling is something we've advocated in these pages many times. It just goes to show that defining where PIC—and corporate—responsibility begins and ends is not easy. We hope this has provided food for thought for everyone from pilots to FBO managers to linepersons. -- Editor.

Airplane Crash Avoided by FAA Tower

What a headline—an acknowledgement by the media that FAA does do its job. Is this a fantasy? No. It's very real, and we thank one of our readers for sending this in. Unfortunately, even though the story actually happened, the headline never made it to print, except for here.—Editor

It seems that every accident that happens in aviation, whether minor or major, is given front page headlines or TV coverage. I would like to give front page coverage to an accident that was avoided.

On May 27th (Memorial Day), I drove out to Timmermann Airport (Milwaukee, WI) to put in a little flight time. Having checked out the 172RG I had reserved, I began taxiing to runway 4L. Upon preparing to cross runway 15L, the tower instructed me to hold short as there was a Skymaster doing a fly-by the tower.

As I continued to monitor the tower frequency, I became aware that the Skymaster could not get its gear down, and the tower was visually checking the gear's position. Over the course of the next hour and 20 minutes, I monitored the tower frequency as the controllers (male and female) not only managed to coordinate the field people (mechanics, fire department), Mitchell International Airport (five miles away as a possible landing site), and others who could help; they also kept the field open and operating—all in a very clear and professional manner.

With the assist of all above, the Skymaster's pilot managed to get the gear down and (hopefully) locked into position. Having remained flying in the general area, I contacted the tower and volunteered to do a "fly under" to check out the gear's position. Again, the tower proceeded to vector us both to a spot where the maneuver could be performed with ease and safety.

During all of the above, a local TV station, that had picked up on the problem by monitoring the radio, had been waiting with cameras, etc., with the hope (sad to say) of a spectacular crash story. When everything turned out without a major incident, they packed up their gear, returned to the station, and gave the story three seconds of air time.

The big story of how a possible disaster was avoided was completely ignored.

In today's busy skies, we pilots have a tendency to complain about "too much controller." However, how nice it is to have people in the control tower like those at Timmermann when problems do arise.

Thanks, FAA, for making my sky safer.

George W. Kubisyk
Mennomet Falls, WI

TOP 10 ACTUAL TRANSMISSIONS MADE IN A TRACON

We hope you enjoy our aviation version of David Letterman's Top 10 list. We also hope our air traffic friends will take this list in the good humor in which it's meant. If any controllers send in a list of pilot transmissions, we'll print that, too.

10. "Citation 123, if you quit calling me Center, I'll quit calling you twin Cessna."
9. "If you hear me, traffic no longer a factor."
8. "I am way too busy to have anyone cancel on me."
7. "You're gonna have to key the mike. I can't see you when you nod your head."
6. "Put your compass on E and get out of my airspace."
5. "Don't anybody maintain anything."
4. "Climb like your life depends on it, because it does."
3. "If you want more room, Captain, push your seat back."
2. "Leave five on the glide, have a nice ride, lower inside, twenty-six nine...see ya!"

AND THE NUMBER ONE ACTUAL TRANSMISSION HEARD WAS –

1. "Air Force One, I told you to expedite."

The list was collected and sent to us by Mr. David Joseph of the General Aviation Pilot's Association.

LOOK BEFORE YOU JUMP

by Ted Stanley

Dead or weak batteries are a problem in any season, but there always seems to be a rash of them in cold weather. Pilots, have you ever been all loaded up, running a little late, climbed into the cockpit, flipped on the battery master, turned the key, and found that very little, if anything, happened? In this case your first thought might be, "Where can I get a jump?" Right? WRONG!!

Mechanics, how many times have you looked out onto the ramp and seen a pilot slowly wearing down a plane's battery and thought of everything from "Here comes a quick buck!" to "I don't have time for this!"? Don't be tempted into making a quick fix no matter how impatient the pilot seems to be.

When an aircraft won't start your first thought should be, "Why?" A dead or weak battery is often the cause of engine starting problems, but don't stop there; ask questions.

Is the alternator belt loose?—resulting in low or no charging. Perhaps the alternator mounting bracket is loose or broken.

Are the battery terminals corroded? Clean them and apply a protective coating, such as grease. Ensure that the battery compartment venting system is working properly. Check the system voltage; if it is set too high the battery will "boil." A bad cell will also cause a battery to boil.

Has the voltage regulator failed? Repair the wiring or replace the regulator.

Is the voltage regulator improperly adjusted? Check out the system. System voltage set too low does not allow the battery to maintain the proper state of charge resulting in reduced capacity and battery service life.

Are one or more of the diodes in the alternator defective—resulting in low system voltage? Use the service manual and/or listen for a whine or rumble from the uneven load on the alternator. Repair or replace the alternator.

Was the battery master switch left on? Check other equipment items such as the turn coordinator and/or master relay that may have been working while the aircraft sat for hours without the benefit of cooling air.

Did a courtesy light or other electrical load remain on after shutdown? Find the problem and correct it. Sometimes a baggage compartment light switch will fail in the on position.

Was the battery simply beaten to death as the result of improper staring methods? Normal, hot, and cold starts all require different techniques. Take a moment to read the pilot's operating handbook and understand the system. Ask someone who is familiar with your engine about methods that work.

As a mechanic, I've had pilots come to me with all these problems and then some. I remember a pilot whose lead battery post became so hot it melted as a result of high electrical resistance between the aluminum wire and terminal. (Piper aircraft should have aluminum battery cables removed in accordance with the latest revision of Service Bulletin 836.)

I remember another pilot whose battery split open after freezing during the winter because the battery sat idle and discharged. He had gotten a "jump" at his home airport and wanted another one upon arriving on Martha's Vineyard an hour later!

I remember one who was "jumped" as his home airport and experienced total electrical failure en route. His master relay was defective, his ammeter was inoperative, and one of his battery posts had melted the plastic around it. Luckily, he was day VFR .

An aircraft battery acts as a storehouse of electrical power. It has several functions. It provides power for engine starting, it serves as an electrical reservoir to power high current, non-continuous loads (landing gear motor, landing lights, etc.), and it serves as a source of power if the electric power generating system should fail. A dead or weak battery is UNAIRWORTHY.

Picture this. It's dusk, and instrument conditions cover your route of flight. Would you launch after a jump start with a weak battery? Think about it. Even during daytime in VFR conditions, if your charging system fails, you will have only a few, very short minutes before you lose your aircraft lighting, electrical engine gauges, fuel gauges, avionics, stall warning indicator, electrically powered landing gear and indicator lights, electric flaps, your options, probably your composure, and possibly your life. Remember, too, that if an aircraft needs a jump it probably has some other problem with or related to the electrical system.

It never ceases to amaze me how little pilots understand the mechanical workings of their aircraft. Take a little time and study the "aircraft systems" and the "handling, servicing, and maintenance" sections of the pilot's operating handbook. Spend some time with your mechanic and ask questions.

Although an alternator or generator is normally considered part of the charging system, it's really a misnomer. The alternator or generator was never intended to charge the battery. It is only there to supply current tot he various electrical components and to maintain the battery's proper state of charge.

Consider that the charging system treats the battery just like any other load. A dead battery is a big load, and most things fail when the load on them

is highest. A failing charging system could be the reason the battery was weak in the first place.

A lead-acid aircraft battery is NOT like a car battery. It is smaller and therefore has less capacity. Its internal construction is more fragile and less tolerant of electrical abuse. As a battery discharges a chemical change takes place. When it's charged the process reverses. It takes 12 to 24 hours to charge a dead battery properly. Although new batteries are often "dry charged" at the factory, they only attain their full capacity and maximum service life if they are properly charged after they are filled with electrolyte (acid). Don't think that you can get a "jump," sit on the ramp for 20 minutes with the engine running, and have a fully charged battery. It is chemically impossible. The battery may be charged with enough power to start the plane, but it will lack any significant endurance.

Endurance is a function of capacity and contents. The capacity of a battery will diminish over its life span (normally three to five years). It is like a car with a fuel tank that gets smaller over the years. The contents (amount of charge) in a battery is equivalent to the amount of fuel in the tank. If you have a little fuel in your tank, you can travel a few miles, your car will run fine, have plenty of power, and everything will seem normal, but if suddenly you need the reserve to make a long trip, you're in trouble.

A cockpit voltmeter is a very useful tool. It can be a sort of fuel gauge in the event of a charging system failure, and as the voltage drops, so do your options. By checking the system voltage before engine start and again while the starter is cranking, it can indicate if your battery is weak. If your aircraft is not equipped with one, consider buying one that plugs into the cigarette lighter. They are available from a variety of sources, including most pilot shops. Just be sure not to plug a 12 volt meter into a 24 volt aircraft!

A properly calibrated voltmeter can determine if your charging system is maintaining the correct voltage. System voltage should be about 14 volts for 12-volt batteries and 28 volts for 24-volt batteries, but check your pilot's operating handbook or ask your mechanic to be sure. It's actually possible to have an indicator of positive current flow on your aircraft ammeter and not have enough system voltage to run the various aircraft system and maintain the battery in a proper state of charge. Normally checks and adjustments to voltage regulator should only be made after the system has had time to warm up properly—after a flight of 30 minutes or more is best.

Let's say the master switch was left on. What about charging the battery? This is best left to a mechanic; however, under FAR § 43.3(g), pilots are permitted to service batteries as preventive maintenance on any aircraft, which is not used in air carrier service, owned or operated by that pilot.

Charging an aircraft battery is not complicated, but some special rules apply. A brief outline of the procedure follows, but for a comprehensive service manual on lead-acid battery care, contact the battery's manufacturer.

- Remove the battery from the aircraft before charging.
- To avoid dangerous sparks remove the negative cable first and install it last.
- Unless the electrolyte level is below the plates, never add water to a discharged battery because the electrolyte level rises during the charging process.
- Never use an automotive "quick" charger. It will damage the plates and result in premature battery failure. Using a constant potential charger will result in a tapered charge, which is fine except that it may take several days or more to achieve a full charge.
- Leave the caps on the battery during charging.
- The battery may become warm but should not get hot during charging or else the plates may warp.
- A more complete charge results from the use of a constant current charger; however, the charging process must be monitored to avoid overcharging.
- Once the battery starts to gas (bubble or fizz slightly) check the specific gravity with a hydrometer to determine the state of charge. A fully charged battery will have a specific gravity of about 1.265 to 1.300.
- The normal procedure is to charge the battery at a low rate—about two to three amps until the battery starts to gas—then reduce the charge rate to half the initial rate.
- The gasses produced—hydrogen and oxygen—are explosive when combined so avoid sparks by turning the charger off before disconnecting the battery. I've seen a battery explode, and it's not something I'd want to see again.
- When the specific gravity in all the cells has stabilized, stop the charge, allow the battery to rest for several hours, and check the gravity again.
- After charging, the battery and battery compartment must be clean, dry, and free of any acid residue (may appear as a white, powdery substance) before installation.
- Remember to make an airframe logbook entry as required by FAR § 43.9 as to the work performed. This last item is important because an incomplete maintenance history makes it difficult to maintain an aircraft in a safe condition.

Fly safely, and for happy landings remember to "Look Before You Jump!"

Mr. Stanley is an Aviation Safety Counselor with the FAA's DuPage, IL FSDO, holds an A&P certificate and an inspection authorization, and is an 8,000-hour air taxi pilot.

by Phyllis-Anne Duncan

Mr. General Aviation

Bernard A. Geier

In 1979 I came to work for the FAA, and it seemed to combine for me the things I liked doing best—writing and airplanes. As I settled in to my government job and began learning all the protocol of whom I could speak directly to and whom I had to get management intervention for, I noticed that every morning a sprightly man with a perpetual smile came by the office and cheerily wished everyone there a "Good morning! How are things going?" I didn't know who he was, so I simply mumbled, "Good morning," barely looking up from my manual typewriter.

Finally, after several weeks, I turned to my deskmate, after the usual morning interruption of my very important (in my mind) work, and said, "Who is that guy? The official greeter or something?" She smiled indulgently at me—she'd been on the job over a decade—and said, "That's Mr. Geier. He's the boss."

Oh.

From then on I managed to be a little more, shall we say, interested in his greetings.

Having come from private industry where I was told the President of the non-profit organization I worked for was much too busy to acknowledge such an underling as I, I had learned to arrive at my desk quietly and begin working and certainly not initiate inane conversations with management. This FAA place and Mr. Geier, then, were certainly a breath of fresh air.

I would come to learn that Mr. Geier, Chief of the General Aviation and Commercial Division of the Office of Flight Operations, would arrive at work before anyone else, clear his in-box, and then "make his rounds," making it a point to greet every division employee in the office that day. This may not seem like much, but when Mr. Geier retired from the FAA, what his former employees missed most about his various successors was that cheery and encouraging morning greeting.

Bernie—I still have trouble addressing my former boss as Bernie—11 years after his retirement from FAA, can still lay claim to the title of "Mr. General Aviation." General aviation had been his vocation, avocation, and career since leaving the U.S. Army Air Corps. Bernie has flight instructed, run an airport, run an FBO, run a pilot school, trained probably thousands of pilots, and served as an aviation safety inspector when the FAA was the CAA and inspectors got to fly to their constituents in government aircraft proudly bearing the CAA seal. "We wouldn't be able to do that today," said Bernie. "We'd probably get shot."

Bernie got his start in aviation from his older brother Bob who was already a pilot in California in the years before World War II. When Bernie graduated from a Pittsburgh, PA high school in 1942, Bob convinced him to make the Greyhound bus trip across the country to California to learn how to fly at Eddie Martin School of Aviation. At Silver Lake Airport in Baker, CA Bob got Bernie hired as a mechanic's helper and began his flight lessons. He soloed in a Piper Cub in August of 1942. Before Bernie could get his private pilot's certificate, Uncle Sam intervened and drafted him in April of 1943. The Army, ironically enough, stationed him back in Pennsylvania in Reading, where he was assigned to the Liaison Squadron to become a Liaison Pilot, an enlisted job. Later in 1943, he was accepted as an Aviation Cadet and received his wings and commission as a Second Lieutenant in March of 1945. His primary training was in the Boeing PT-17, and his basic and advanced training was in the AT-6. After graduation he completed gunnery and transition training in the Curtiss P-40. Also during this period he managed to obtain what Uncle Sam had interrupted—his Civil Aeronautics Administration (CAA) civilian commercial pilot certificate.

In August of 1945 World War II ended in the Pacific Theater and Bernie was soon discharged. He found himself back in Pittsburgh, and his brother "rescued" him again. His former employer, Martin School of Aviation now at Orange County Airport in California, had just bought a new Ercoupe. The only problem was it was in Riverdale, MD. However, the Ercoupe represented free transportation back to California. In January 1946, Bernie began the cross-country trip in the Ercoupe and went back to work for Martin. By March he was a flight instructor, and he followed that quickly with his multiengine and instrument ratings and ground instructor certificates. He taught ground school and day and night flying at Martin in aircraft and in a Link trainer. Barely a year after returning to Martin, he was made Assistant Manager, and in 1950 was promoted to Manager of Flight Operations for Martin Aviation. He succeeded his brother Bob in those positions. During World War II, Bob had left for a new challenge, as something called a CAA inspector for the Department of Commerce.

Some time before Martin Aviation had hired a young woman named Beverly Myers of Newport Beach, CA, as a secretary/dispatcher. Her work kept her at Orange County Airport sometimes until late evening. (Maybe it was to catch a glimpse of Howard Hughes, who before his recluse days, frequently flew into Orange County, where a succession of his starlet girlfriends would meet him.) Bernie, gentleman that he always has been, began walking her to the bus stop to make sure she headed home safely. Four children later, Bernie and Bev will celebrate their 50th wedding anniversary next January. Bev truly became Bernie's aviation partner. In his job as Chief of the General Aviation Division, Bernie began partnerships with industry long before they became an FAA buzz word. He was the FAA manager on site at many major aviation events such as Oshkosh and Sun 'n Fun. He and Bev began traveling to these events in the first of a succession of recreational vehicles. Bernie would be at the temporary FSDO making sure his inspectors were doing their jobs, and Bev would provide a cool, refreshing haven for any FAA employee who needed a rest and a clean restroom. Charming and loquacious, Bev— "The Boss" as Bernie called her—always eased the hard work of monitoring an air show.

But back to Bernie's career. In 1951 Bernie made a change to Darr Aero Tech of Marana, AZ where he was, of course, a flight instructor. Darr Aero had just received a contract to operate a Primary Flight School for the U.S. Air Force. Bernie became a Flight Commander and supervised 25 flight instructors and some 75 to 100 flight students at a time. By the time the school closed in 1957, he had trained hundreds of Air Force pilots in T-6's and later in PA-18's, then T-34's and T-28's.

Brother Bob had left the CAA to become an Administrative Assistant for California Congressman James Utt, but since Bernie was now out of a job, Bob encouraged Bernie to apply at CAA. In August of 1957 Bernie was assigned as a CAA operations inspector at the Aviation Safety District Office in Fresno, CA. While working in Fresno, Bernie received his ATP. (He would eventually add on rotorcraft/helicopter and a DC-3 type rating, as well as type ratings in numerous business aircraft.) In January 1959 Bernie was promoted to the Billings, MT office and six months later became the Supervising Inspector there. The CAA by this time had changed names and was now an independent agency—the Federal Aviation Agency.

While at Billings, Bernie not only acquired his Airframe and Powerplant (A&P) certificate, he also completed training in aerial application. This apparently caught the attention of management because he was promoted once again and assigned to the Milwaukee, WI office in 1963. By April 1965 he was assigned as Supervising Inspector at the Kansas City, KS office.

By 1967 the FAA Regional Office in Kansas City, MO, had an opening and Bernie became an Operations staff specialist there. In 1972 he came to FAA's Washington, DC headquarters as the manager of the General Aviation Operations Branch. Three years later during a re-organization, the General Aviation and Commercial Division was created, and Bernie was assigned as its first Chief. This new division was

charged with developing the FAR and associated guidance materials for all general aviation activities from airman certification to air shows, as well as aerial application, helicopter external load operations, and pilot schools—all areas where Bernie's expertise was obvious.

It was during Bernie's tenure as the manager of the General Aviation and Commercial Division in the early 1980's that the operation of ultralight vehicles—or powered hang gliders as we called them—burgeoned. The rapid growth and several notable accidents raised concerns that FAA was not doing its job. (I'm speaking of the early 1980's, not the mid 1990's. It's deja vu all over again. You'd think we'd get used to it by now.) Bernie recognized that there needed to be some regulation of an aviation entity where non-certificated persons were operating quasi-aircraft in the same airspace as commercial operators. There needed to be a balance between protecting the public and allowing ultralights to achieve their appropriate expression. The result was FAR Part 103, Operation of Ultralight Vehicles.

This new FAR established the parameters for ultralight vehicles and allowed them limited access to airspace and aviation services. The public was protected, and ultralights were allowed a generous amount of freedom to operate safely. Bernie considers this regulation, created in cooperation with the industry, as his crowning achievement in his FAA career. He recalls that when a team of FAA managers, himself included, were called to the Secretary of Transportation's office to justify the regulation, the atmosphere was a little hostile. The DOT Secretary's staff couldn't believe that the FAA was going to allow non-pilots to operate funny little airplanes beside passenger-carrying 747's. That was not the case, of course, but the other members of the team were not having much luck convincing anyone otherwise. Finally, Bernie, who had already set his retirement date, said, "Well, if the Secretary is not going to sign off on this, she can explain to the ultralight industry—who happen to vote, by the way—why they're not going to get this regulation—because I'm not going to do it."

Mr. General Aviation today in his home office in Virginia.

Brash, perhaps, but typically Bernie, putting the responsibility exactly where it belonged. Secretary of Transportation Elizabeth Dole signed the regulation shortly after. In the 12 years since, FAR Part 103 has been one of the few FAR that has not required numerous updates and changes.

In January of 1985 Bernie brought his government career to a close, but that didn't mean retirement by the fishing hole. A fellow by the name of Herb Kelleher offered Bernie the Chief Pilot's job at his upstart, discount airline called Southwest. But Bernie's heart was, and has always been, with general aviation. Instead of Southwest Airlines, Bernie lent his expertise to AOPA, the International Council of Air Shows, the National Agricultural Aircraft Association, the EAA, the Soaring Society of America, and others too numerous to list. During his tenure as executive director of the National Flight Instructors Association, he presided over a membership that quadrupled. He served as Air Boss for numerous, famous air shows. His retirement is really a misnomer; he stayed just as busy as he always was. In some ways we here at the FAA saw more of him after his retirement than his extensive travel schedule had allowed before.

Bernie has reduced his general aviation participation to a single organization, Silver Wings Fraternity. Silver Wings Fraternity is an organization for people who soloed a powered aircraft more than 25 years before applying for membership. The Fraternity numbers more than 11,000 members (about 3,500 active), and Bernie manages the organization from the basement of his Fairfax, VA home, whose walls are covered with aviation memorabilia and mementos of his long and distinguished career—a career in which Bernie rightfully takes deep and unabashed pride.

Bernie maintained an active flight instructor certificate until Bev had a stroke in 1993. Just as he protected her on her walks to the bus stop 50 years ago, Bernie is now her full-time care-giver, the only job he is interested in. But Bev has recovered to the point where there is a bigger and better RV (number three) that still wends its way south to Sun 'n Fun in the Spring and north to Oshkosh in the Summer.

Bernie's legacies to aviation are many, not the least of which are two of four grown children who are pilots. Mr. General Aviation has left his mark, indelibly so, on general aviation through his many friends in the business (among them Bob Hoover and Paul Mantz); through countless military and civilian pilots he trained; through regulations he fostered, enacted, and enforced; and through hundreds of FAA operations inspectors he supervised.

And one magazine editor who learned it was okay to say "Good Morning" to the boss.

For information on the Silver Wings Fraternity, contact Bernie at 5021 Powell Road, Fairfax, VA 22032; (703) 323-8763; fax (703) 323-8214.

• A Ghost-Written Wagstaff?

We know that the magazine does not print [anonymous] letters to the editor, but can I speak for dozens of women pilots who feel that the article by Patty Wagstaff in the May/June issue seemed out of line with the statement on your masthead that the magazine "promotes aviation safety by calling the attention of airmen to current technical, regulatory, and procedural matters affecting the safe operation of aircraft."

Having met Patty Wagstaff, we must assume that the article was "ghostwritten" or embellished by another writer. Patty is a fine pilot and well-spoken. However, in this article, the answers to legitimate questions were often silly and sometimes "wiseass."

A Group of Women Pilots and Flight Instructors
Letter postmarked Miami, Fl

You're right. We don't usually publish anonymous letters, but we'll make an exception in this case. Our articles are never, repeat never, ghostwritten. If a byline appears under an article, it means that that person wrote it or represented to the Editor that he or she wrote it.

The Editor approached Ms. Wagstaff for an article by and about air show performers, and this article was what Patty submitted under her byline. The Editor spoke over the phone with her several times about changes, which she made and either faxed or over-nighted to the magazine's offices. If Patty used a ghost-writer, she never indicated it to us. In her article, she acknowledges that some of her answers are wisecracks initially, but she goes on to answer each question seriously. We printed the article because we felt it was quintessential Patty—talented, amusing, brash, and refreshing—and several people who know her well have commented that the article definitely had Patty's mark on it.

Of course, if it offended anyone, we apologize, and since the Editor is a "woman pilot and flight instructor" herself, the publication of the article was in no way intended to be insulting to either women pilots or flight instructors.

• Single Yoke Flight Operations

I have been flight instructing for many years and have seen some of the controlling factors on the parameters we use for "flight instruction" evolve. The flight review, for example, could be considered flight instruction or not years ago but now flight instruction is specified in the FAR in the time required for a flight review. Which means to me a flight review is flight instruction now and if a flight review is given the time must be logged as flight instruction among other things.

This relates to a dilemma I have experienced regarding the instruction or not in aircraft with a single yoke. The FAR dance all around this issue including a back and forth motion between single engine and multi-engine aircraft. I know of no instruction which is authorized in a multi-engine aircraft with a single yoke. The issue is further clouded by the various currency requirements and whether any is considered instruction as in instrument currency or, say, recency of experience requirements.

Since I have asked several experts about this subject over the years and have gotten everything from a soft shoe to a clearly incorrect response, I would like the matter addressed.

1) What instruction is authorized in a multi-engine airplane with a single yoke?

2) Is currency-required flying (requiring a sign off) flight instruction? CFI acting as other than safety pilot

3) What instruction is not authorized in a single engine airplane with single yoke?

These questions are in relation to operations with regard to parts 61 and 91 of the FAR, principally. I have read and read the regulations over the years regarding these subjects and have operated on the assumption that a doubtful situation means a no; but some of the experts I have encountered over the years seem to perceive a doubtful situation as a yes. Of course, assumptions and implications often lead to incorrect application of the regs.

Kenneth W. Brown
Humble, TX

The answer to Question Number 1 is any instruction in which the instructor does not have to act as PIC and exercise any control. For example, the instructor can give instrument instruction in simulated instrument conditions (under a hood) to an appropriately rated multi-engine pilot who meets all requirements to be PIC of the multi-engine aircraft. In this case, it is important that the instrument student operate the aircraft in only simulated instrument conditions (under a hood) so that if the student "loses the aircraft while on instruments" the student can remove the hood and recover.

The answer to Question Number 2 is if it is given by an appropriately rated instructor and the instructor signs the flight off as instruction.

The answer to Question Number 3 is any flight in which safety is at risk such as primary flight instruction to a student pilot.

The key to answering your questions is flight safety or if the flight is prohibited by the FAR. If the flight is not prohibited by the FAR, then the instructor giving instruction or an examiner giving a check ride must determine if the flight can be done safely. In some cases, safety also depends upon the experience and skill of the pilot operating the only set of controls. The bottom line is the instructor or pilot examiner is responsible for deciding if he or she is willing to risk his or her life or certificates on the judgement and ability of the pilot operating the only set of controls in an aircraft with only one set of controls.

• Choice of Altitude

Recently upon departing an uncontrolled field proceeding VFR to the east, I had to visually maneuver above a broken cloud deck to eventually reach VFR on top. I was at 5,500 feet and had established radar contact with the appropriate approach facility for flight following. En route it became obvious that 5,500 feet would not keep me above the clouds for very much longer, so I called the controller and asked if I could climb to 6,500 feet, recognizing that this was the wrong altitude for my direction of flight but not wanting to climb higher for a relatively short trip. His response was to climb to any VFR altitude I desired. I really didn't know how to interpret this, so I thought I'd better play it safe and just went on up to 7,500 feet anyway.

My question is, "How should his response have been interpreted?" Could I have picked any altitude I wanted to as long as I stayed VFR, or was he telling me in essence that I had to fly 7,500 feet or any VFR altitude appropriate to my direction of flight?

Carl I. Simons, M.D.
Penndel, PA

Air Traffic Control (ATC) Specialists expect pilots operating under a visual flight rules (VFR) flight plan to comply with the applicable parts of the Federal Aviation Regulations (FAR). This includes the responsibility to see and avoid other aircraft (FAR § 91.113), comply with VFR visibility and distance from cloud criteria (FAR § 91.155), and operating at the correct altitude for direction of flight (FAR § 91.159), among other applicable FAR sections.

The term "VFR-On-Top" is only used in the context of a pilot on an IFR flight plan, operating in VFR weather conditions, who is requesting to select an altitude or flight level of their choice (subject to any ATC restrictions), see Aeronautical Information Manual (AIM) paragraphs 4-4-7, and 5-5-13. Accordingly, VFR-On-Top is not an accurate term to be used to describe the situation stated in your letter.

The qualification used in FAR § 91.159, "unless otherwise authorized by ATC," may be confusing. In this case, it appears the pilot was unsure whether or not he received ATC authorization to fly at a wrong altitude for direction of flight.

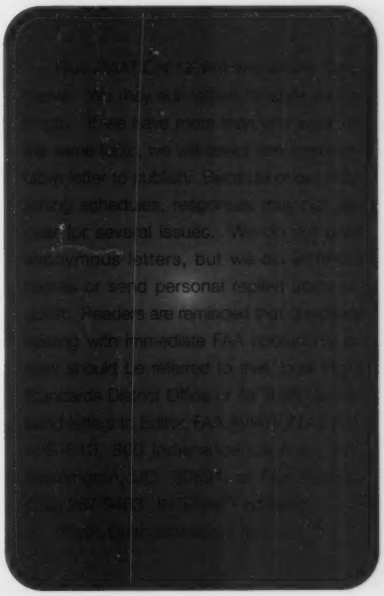
The term "authorization" referred to in FAR § 91.159 is an ATC clearance. When ATC is responsible for the separation of aircraft they will issue an authorization as a clearance. For example: In Class B airspace a VFR aircraft may be assigned an altitude contrary to FAR § 91.159 to meet the separation standards required for that airspace. Those VFR aircraft assigned altitudes contrary to FAR § 91.159 are advised by ATC to resume altitudes appropriate for the direction of flight when the altitude assignment is no longer required or when leaving Class B airspace.

In airspace where ATC has no requirement to separate VFR aircraft, the pilot operating VFR has the sole responsibility for separation. The only requirement ATC has is to issue safety alerts, and workload permitting, traffic advisories. Under these conditions, an approval from a controller to a pilot who requests to fly at an altitude contrary to FAR § 91.159 is not an authorization for the pilot to violate the regulation. It is rather, an approval to a request based solely on whether or not the request would compromise safety. For example: a VFR aircraft is flying at 5,500 feet and requests to climb to 6,500 feet. The controller may respond with a quote of opposite direction traffic at 6,000 feet or may respond "approved," indicating there was no traffic.

Depending on how the pilot's request or intentions are phrased, controllers may simply acknowledge the transmission (e.g., "Roger"), or advise the pilot that they see no problem with numerous maneuvers (e.g., "Maintain VFR altitudes, your discretion."). None of these responses from a controller constitute an authorization to deviate from FAR § 91.159. In issuing an approval to a pilot's request to fly at an altitude contrary to that prescribed, ATC assumes no separation responsibility. *It is still up to the pilot to see and avoid, and understand there may be traffic unobserved by radar.*

In the scenario you described, it is impossible to guess what the controller's response was intended to mean. In all probability though, the controller expected the pilot to maintain his own separation, saw no immediate safety problems with the request and issued an approval for the pilot to climb to any appropriate VFR altitude. What altitude a pilot operating VFR chooses to fly at while complying with FAR is strictly up to the pilot. The pilot, in this case, could have picked any odd thousand foot MSL altitude plus 500 feet, in the Doctor's example, 7500' MSL or 9500' MSL are good choices.

In closing, we would like to emphasize the importance of communicating with a controller when something is unclear. When doubtful about a clearance or any transmission between controller and pilot, immediate clarification is the best course of action.



1996 GENERAL AVIATION MAINTENANCE TECHNICIAN AND CERTIFICATED FLIGHT INSTRUCTOR OF THE YEAR AWARDS

The flight instructor and the maintenance technician are two of the most important people in the world of aviation. Without them the continuance of flight would be impossible as both are responsible for keeping aircraft in the sky—one through training future pilots and the other by keeping aircraft airworthy. This is why the National Certified Flight Instructor and Aviation Maintenance Technician of the Year Awards Program was initiated to recognize the important role they each play in aviation safety and pilot education and to reward an active flight instructor and maintenance technician for outstanding contributions to the general aviation industry.

The 1996 Certified Flight Instructor of the Year is Ludwig "Lou" Wipotnik of Mount Prospect, IL and the 1996 Aviation Maintenance Technician of the Year is Ralph L. Michalka of Kalamazoo, MI.

Pictured from left are: Ralph Michalka, FAA Administrator Hinson, and Lou Wipotnik.

According to Lou Wipotnik his whole adult life has been aviation oriented. He was just out of high school and unable to afford a car, but he was determined to learn to fly, so he hitchhiked or rode his bike to the Pal-Waukee Airport 20 miles from his home. He soloed in a Piper J-3 Cub in 1957 and received his pilot certificate two years later. Before he joined Japan Airlines' sales and marketing office in 1971, he would work for Trans World Airlines' (TWA) reservation and ticket office, serve three years in the U.S. Army flying Hiller H-23 RAVAN helicopters and eventually controlling air traffic, and in 1968 become a flight instructor. Since that time he has obtained all seven CFI ratings that exist—there are fewer than 50 CFI's who hold all seven ratings in the U.S. Lou is currently working on his last two certificates: ATP Rotorcraft Helicopter, which he hopes to complete by the end of the year; and ATP multi-engine SEA, which will be completed in 1997—Lou's fortieth anniversary as a pilot.

Wipotnik has devoted many hours spreading the word of aviation safety not only to his students but also to all those who attend aviation safety seminars at which he is a frequent speaker. According to one of his nominators, "All in attendance at any of Mr. Wipotnik's programs left with positive comments and knowledge gained." Wipotnik currently instructs part-time for Pal-Waukee Airport's Windy City Flyers Club. He also volunteers his time to the Civil Air Patrol, the FAA's Aviation Safety Counselor Program, Lifeline Pilots (a volunteer organization of pilots who transport people in need of medical treatment), and writes safety articles for the Pal-Waukee Airport Pilots Association's newsletter.

Ralph Michalka began his aviation career in the Air Force as an aircraft electronic specialist working on the B-36, B-47, and B-52. When he returned to civilian life, he decided to continue his aviation career by becoming an A&P mechanic and by 1956 he had received his license. He worked for three years as a line mechanic at Capital Airlines before he moved on to UpJohn Co. For the next 35 years he would go from A&P mechanic to lead aircraft maintenance specialist working on such corporate aircraft as the Beech King Air, the Cessna Citation, and the Gulfstream III. Evening hours would find him working on his own or others' general aviation aircraft.

His skills range from electrical to electronic to airframe of all kinds and over the years his reputation as a problem solver has spread. He has also been known to borrow parts or avionics from one of his own airplanes to get someone else back in the air. (They just had to return Ralph's part after they got their own fixed or replaced.) He is a mentor to anyone willing to learn but also knows that

aviation technology is rapidly changing; so he too continues his training and education in the maintenance field. In 1994 he retired from UpJohn Co. and decided to start a business based on his chief interests—aviation and maintenance. His FBO at Kalamazoo Airport is a real family operation with his wife, Nola Jean, as the office manager and his son, Jim, as one of the A&P's.

Ralph Michalka's aviation career can be summed up in the words of one of his nominators. His "dedication to precision, thoroughness, and safety has earned him the reputation of being the most respected in the aviation maintenance community. His dedication to safety goes beyond the service aspect by promoting the education of aircraft owner/operators in proper maintenance, prevention, and procedures resulting in safer aircraft operation."

Both Wipotnik and Michalka were honored during the 1996 EAA FlyIn and Convention in Oshkosh, WI. FAA Administrator David Hinson presented the awards on August 4 at Theater in the Woods and over 30 general aviation companies participating in the Industry Awards Program provided an estimated $10,000 of special recognitions to the winners for their achievements in general aviation industry.

This program is sponsored by the AOPA Air Safety Foundation, the Federal Aviation Administration, the Experimental Aircraft Association, the General Aviation Manufacturers Association, the National Air Transportation Association, the National Association of Flight Instructors, National Business Aircraft Association, and the Professional Aviation Maintenance Association.

Next year's winners will be honored at the NATA convention at Fort Lauderdale, FL on March 24-27, 1997. Because the time is so short, applications need to be submitted to your local FSDO by December 31, 1996. Contact your local FSDO or FBO for an application or more information.

FAA NPRM TO REQUIRE INCREASED PARAMETERS FOR FLIGHT DATA RECORDERS

On July 16, the FAA issued a Notice of Proposed Rulemaking (NPRM) that will help accident and incident investigators better identify probable cause. The NPRM calls for an increase in the amount of data parameters for flight data recorders (FDR) for nearly 6,000 existing air carrier aircraft and for all future transport category aircraft.

The number of specific areas of flight information would increase from 11 to 17 for some older aircraft and to 88 data parameters for future type certificated aircraft. If adopted, the NPRM would require operators to retrofit aircraft within four years of the final rule. A recommendation by the NTSB for a six-month time period to retrofit B-737 aircraft was deemed impractical by the FAA, in that a whole fleet—hundreds of the same make and model of aircraft—would have to be taken out of service at one time. The NPRM is in response to several NTSB recommendations. Since 1967, the FAA has responded favorably to 90% of the urgent recommendations issued by the NTSB and has responded at a high rate for other recommendations.

Depending upon the age and complexity of the aircraft, the NPRM would upgrade FDR as follows:

	Aircraft	Current Parameters	Proposed Parameters
Category 1	1,929 aircraft over 30 seats: 727, 737, L-1011, DC-8, DC-9 F-28	11	17/18
Category 2	1,360 aircraft over 30 seats; 704 turboprops: A-320, 737, 747, 757, 767, DC-10, F-28, MD-80, ATR-42, EMB-120, SAAB-340, DHC-8	17	17/22
Category 3	1,036 aircraft over 30 seats; 673 aircraft 10-19 seats; 277 aircraft 20-30 seats: 737, 747, 757, 767, 777, F-100, MD-11, MD-80, MD-88, MD-90, ATR-72	Up to 29	34
Category 4	All newly manufactured aircraft, existing derivatives, and any new type certificates	29	57 (3 yrs) 88 (5 yrs)

NEWS

SEAPLANE PILOTS CAN NOW EARN THEIR "SEAWINGS"

In the first major innovation to the FAA Aviation Safety Program's Pilot Proficiency Award Program (WINGS) since its inception in 1977, Aviation Safety Program Manager Roger M. Baker, Jr. has announced a new set of wings called SEAWINGS.

The WINGS program was designed to encourage pilots who are not required by regulation to obtain recurrent training to take dual instruction and attend an FAA safety seminar over a year's period. Pilots meeting the qualifications each year receive a certificate from the FAA and a distinctive lapel pin in the shape of aviator's wings. Currently, the program goes up through 20 phases, with pins being issued for the first 10 years and a certificate only each year from 11 to 20.

Over the 19 years of the program it has previously been expanded to include balloon pilots, glider pilots, helicopter pilots, and operators of ultralight vehicles. Regardless of the category of aircraft, however, the pilot still received the same wings. Seaplane pilots have always been able to participate in the WINGS program under the airplane category.

In early 1996 the Seaplane Pilots Association (SPA) Executive Director Bob Richardson noted that in the first two years of the WINGS program, general aviation accidents declined 25%. SPA then approached the FAA's Aviation Safety Program with an idea put forward by an SPA Field Direction, Dr. Dale DeRemer—SEAWINGS.

"In order to protect ourselves and our privileges to operate seaplanes," said SPA President Jay Frey, "each and every one of us must join the fight to reduce seaplane accidents. The seaplane accident rate was terrible in 1995; we've got to do better."

Richardson and Frey hoped that SEAWINGS would do for seaplane accidents what WINGS did for general aviation accidents, and the FAA agreed that it would be an excellent way to demonstrate FAA and SPA partnership for seaplane safety.

The first SEAWINGS in the country were presented to Dr. Dale DeRemer, Mr. Jay Frey, Mr. David Joseph, and Mr. Ed Burgin. Ms. Betty Meyer received the first instructor SEAWINGS. The SEAWINGS were awarded at the 5th Annual Seaplane Fly-In at Ware Island, AL by the Editor of FAA Aviation News. *Pictured above are, from left to right, Mr. Jim Toombs (SPM in Birmingham, AL), Mr. Burgin, Mr. Frye (EDO Floats), Ms. Meyer, Mr. Joseph, Dr. DeRemer, and Mr. Mike Sacrey (FAA Southern Region Flight Standards Division Manager).*

To encourage seaplane pilots to participate, DeRemer designed a lapel pin similar to the ones already received in the WINGS program but with a distinctive, seaplane difference—an anchor in the background. SPA and Frey's company, EDO Floats, supplied the lapel pins for SEAWINGS, and DeRemer, a professor at the aeronautical department of the University of North Dakota, outlined the requirements for the three hours of dual seaplane instruction.

To earn SEAWINGS, you must be a seaplane-rated pilot, take the specific three hours of dual instruction, and attend a seaplane safety seminar. Logbook endorsements and proof of seminar attendance are the same as for the regular WINGS program. Earning a phase of SEAWINGS also meets the requirement so that you do not have to complete the biennial flight review.

Participants can really extend their recurrent training over their lifetimes as pilots, since you can alternate a phase of the regular WINGS program with SEAWINGS—a minimum of 40 years of recurrent training! Add in gliders and balloons, helicopters or ultralights, if you're so rated, and you'll be improving your flying skills continuously.

More detailed information on the WINGS program and SEAWINGS can be found in Advisory Circular 91-61, "Pilot Proficiency Award Program." The Safety Program Manager at your local Flight Standards District Office can provide you a copy and answer any questions you may have about SEAWINGS. For more information on SPA, contact Bob Richardson at (301) 695-2083.

PASSENGERS' RIGHTS

Aircraft accidents kill and injure passengers and pilots each year. We want you to have a safe and successful outing, so if you're not sure about something, ask your pilot.

A safe pilot will:

Have a seat and seat belt for you.
Show you how to use the seat belt and operate the doors.
Explain the location and use of survival equipment.
File a Flight Plan.

A passenger may ask the pilot:

Are you licensed, rated, and current for this flight?
Have you checked the weight and balance of the aircraft?
Have you filed a Flight Plan?
Should I make alternative arrangements or reschedule because of bad weather?

A passenger may NOT ask the pilot:

To carry a payload beyond the weight and balance limitations of the aircraft.
To takeoff or land at an airport which is less than the length required by the aircraft.
To fly below 500 feet except for takeoff or landing.
To fly into weather he or she considers unsafe or against regulation.
To fly beyond allowable duty time limits.
To take risks by continuing a flight for the sake of meeting one of your prior commitments.

From the January 1996 FAA Alaska Flyer

U.S. Department
of Transportation

**Federal Aviation
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